April 14, 1942. E. N. JACOBI 2,279,623

LOCK SWITCH

Original Filed Dec. 11, 1939 2 Sheets-Sheet 1

Fig. 1.

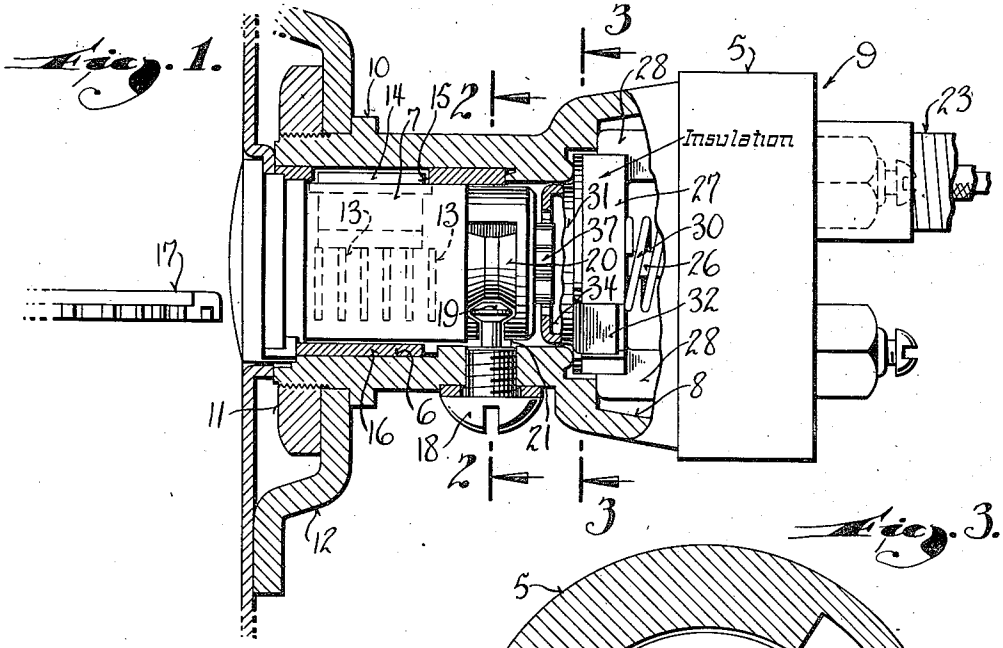


Fig. 3.

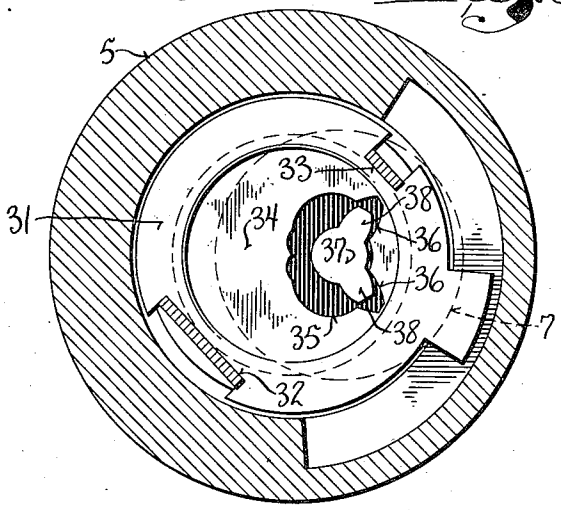
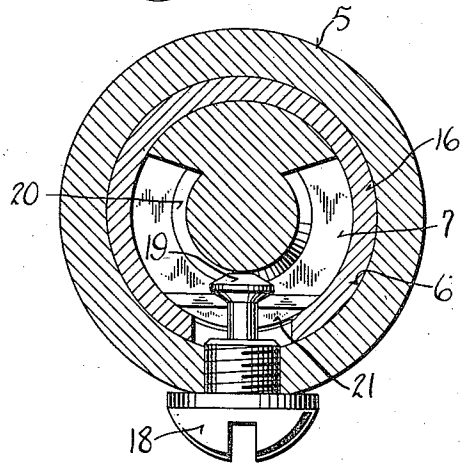


Fig. 2.



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Fig. 4.

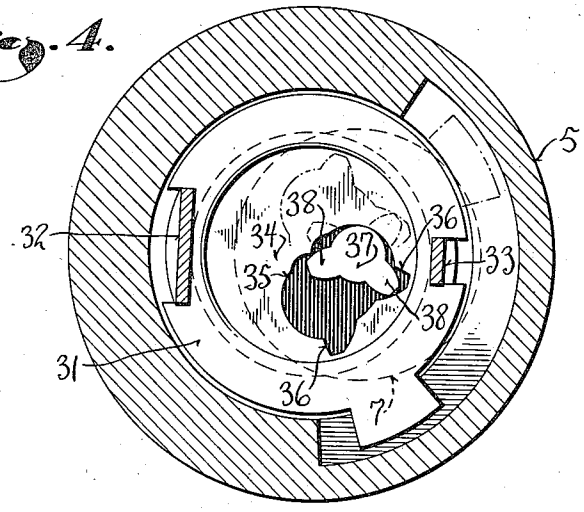


Fig. 5.

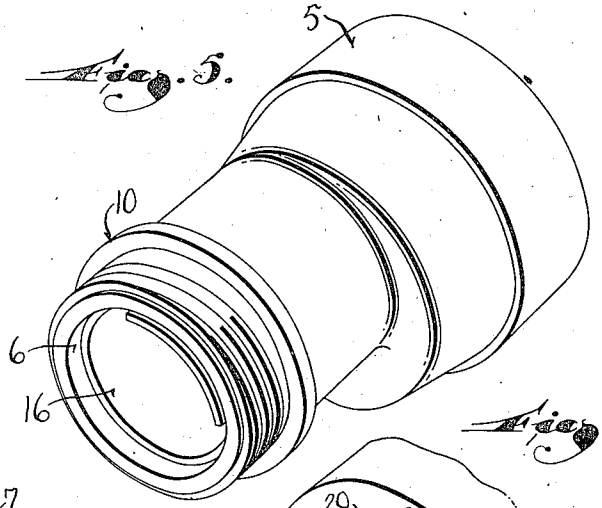


Fig. 6.

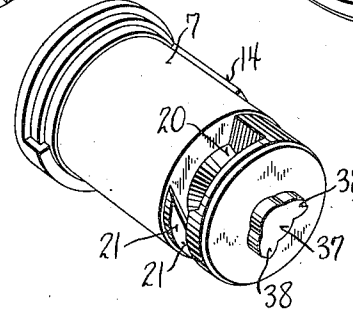
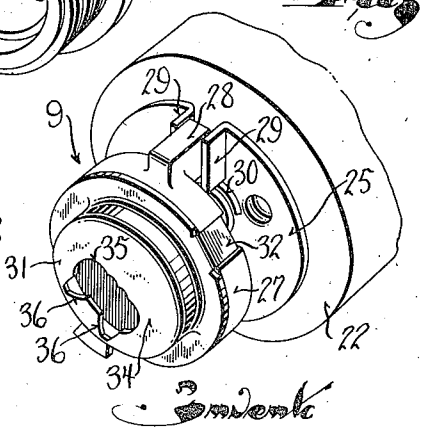


Fig. 7.



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2,279,623

UNITED STATES PATENT OFFICE

2,279,623

LOCK SWITCH

Edward N. Jacobi, Milwaukee, Wis., assignor to Briggs & Stratton Corporation, Milwaukee, Wis., a corporation of Delaware

Original application December 11, 1939, Serial No. 308,664. Divided and this application February 8, 1941, Serial No. 377,985

8 Claims. (Cl. 200—44)

This invention relates to lock switches and refers particularly to ignition coil switch locks for use on automobiles and is a division of the copending application, Serial No. 308,664, filed December 11, 1939.

As a safeguard against theft by shunting out the lock controlled ignition switch, it is customary to encase the switch and the lock cylinder by which the switch is actuated in a hardened metal casing or body.

In switch combinations of this type, the outside dimensions of that portion of the housing which encases the switch cannot be very easily reduced to the diameter of the housing part which contains the lock cylinder. Space requirements, however, often demand that no part of the assembly project beyond the periphery of the forepart of the body in which the cylinder is mounted. This requires the switch to be mounted eccentrically with respect to the axis of the cylinder which introduces difficulties in the drive transmission from the cylinder to the rotary contactor of the switch.

The present invention, therefore, has as one of its objects the provision of a new and improved manner of drivingly connecting the cylinder and contactor in constructions of this type.

More specifically, it is an object of this invention to provide a driving connection between the cylinder and contactor wherein the axial offset between the cylinder and the contactor is utilized to establish a smooth acting planetary gear type connection.

With the above and other objects in view, which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate one complete example of the physical embodiment of the invention constructed according to the best mode so far devised for the practical applications of the principles thereof, and in which:

Figure 1 is a view substantially in longitudinal section through a lock switch constructed in accordance with this invention;

Figure 2 is a cross sectional view taken through Figure 1 on the plane of the line 2—2;

Figure 3 is a cross sectional view taken through Figure 1 on the plane of the line 3—3;

Figure 4 is a view similar to Figure 3 but illustrating the parts turned to another switch position;

Figure 5 is a perspective view of the lock body or casing;

Figure 6 is a perspective view of the lock cylinder; and

Figure 7 is a perspective view of the switch per se and illustrating particularly the manner in which the rotary contactor is driven.

Referring now particularly to the accompanying drawings, in which like numerals indicate like parts, the numeral 5 designates the outer casing or body of the lock switch which is formed of hardened metal, preferably steel, and has a bore 6 in its front end for the reception of a lock cylinder 7 and an enlarged circular cavity or bore 8 in its rear end to receive the switch designated generally by the numeral 9. These two bores are offset axially so that at one side of the casing, the outer wall forms substantially a straight line.

Any suitable means, such as an annular flange 10 and a nut 11 threaded on the outer end of the casing, is provided for securing the casing to a mounting panel 12.

The lock cylinder is of the customary type having tumblers 13 which project a locking bar 14 radially from the cylinder to engage in a slot 15 formed in a liner or bushing 16 secured in the bore 6. The tumblers are retractable upon the insertion of a proper key 17, whereupon the locking bar is retracted out of the groove or slot to free the cylinder for rotation.

The cylinder is removably secured in position by a locking pin 18 consisting of an outer screw portion threaded into a tapped hole in the side wall of the body, and an inner headed end 19. This headed inner end projects into an arcuate groove 20 in the adjacent portion of the cylinder and thereby secures the cylinder against withdrawal.

To guard against unauthorized removal of the cylinder, a ledge 21 extends from each side wall of the arcuate groove 20 at that portion of the cylinder which aligns with the retaining pin when the cylinder is in its locked position of rotation. These ledges 21 thus engage under the head 19 of the pin and prevent removal thereof when the cylinder is in its locked position.

Rotation of the cylinder in either direction from its locked position which, of course, necessitates the use of the proper key permits removal of the retaining pin and consequently withdrawal of the cylinder.

The switch 9 is of conventional design having

a base 22 of insulating material upon which the stationary contacts and terminals are mounted. One of these terminals has an armored conductor 23 connected thereto and leading to the ignition coil.

The contacts mounted on the base 22 are selectively electrically bridged by a contactor 25 rotatably mounted on a stud 26 secured to the base. This stud is coaxial with the switch; and inasmuch as the switch is mounted in the bore or cavity 8 of the housing, it follows that the rotary contactor is constrained to rotation about an axis offset with respect to that of the lock cylinder.

The driving connection from the lock cylinder to the rotary contactor comprises an insulated driver 27 also mounted on the stud 26 and provided with driving ears 28 which engage between suitable abutments 29 on the contactor.

A compression spring 30 confined between the insulated driver and the contactor provides contact pressure and holds the parts against rattling.

Engaged over the outer end of the driver 27 is a cup-shaped metal stamping 31. Two diametrically opposed tangs or lugs 32 and 33 extended from the edge of the stamping engage in notches formed in opposite sides of the driver so that the stamping is nonrotatably connected therewith.

The end or bottom wall 34 of the cup-shaped stamping is spaced from the wall of the driver and, as clearly shown in Figure 1, is directly adjacent to the inner end of the lock cylinder. An aperture 35 in this wall of the stamping is so shaped as to provide internal gear teeth 36. These teeth are radial to the axis of the contactor and extend to substantially the periphery of the cup-shaped stamping.

A projection 37 on the inner end of the lock cylinder enters this aperture and is shaped to provide a plurality of external gear teeth 38 radial to the axis of the cylinder and having a pitch diameter less than that of the internal gear teeth so that the teeth mesh when the parts are properly assembled. A simple efficient driving connection is thus established between the cylinder and the rotary contactor, notwithstanding the axially offset relationship between these elements.

From the foregoing description, taken in connection with the accompanying drawings, it will be readily apparent that this invention provides a substantial improvement in lock switch combinations.

What I claim as my invention is:

1. In a lock switch combination including a rotary lock cylinder and a rotary switch contactor: a body for the cylinder and switch having axially offset but substantially parallel bores in which the lock cylinder and rotary contactor of the switch are mounted and by which said parts are constrained to rotary motion about offset axes; and a driving connection between the cylinder and contactor comprising, a metal cap nonrotatably connected with the contactor and having abutments thereon defining substantially gear teeth radial to the axis of the contactor, and abutments on the end of the lock cylinder substantially defining gear teeth radial to the axis of the cylinder but having a smaller pitch diameter than that of the gear teeth defined by the abutments on said cap, said teeth on the cap and cylinder meshing.

2. In a lock switch combination having a rotary lock cylinder and a rotary switch contactor: means for constraining said cylinder and contactor to rotary motion about offset but substantially parallel axes; and a driving connection between the cylinder and switch contactor comprising, a part non-rotatably connected with the contactor and having internal gear teeth radial to the axis of the contactor, and a projection extending from the end of the lock cylinder forming substantially external gear teeth radial to the axis of the cylinder but having a pitch diameter less than the internal gear teeth and meshing therewith.

3. In a lock switch combination having a rotary lock cylinder and a rotary switch contactor: means mounting the cylinder and contactor and holding them in definite predetermined relationship with the axes thereof offset but substantially parallel; and a driving connection between the cylinder and switch contactor comprising, a metal stamping having a substantially flat wall in juxtaposition to the end of the cylinder, said wall having an aperture shaped to provide internal gear teeth, and a projection on the end of the cylinder entering said aperture, said projection being shaped to provide external gear teeth meshing with the internal teeth of the stamping.

4. In a switch of the character described: a rotary contactor constrained to motion about a fixed axis; an actuator for the contactor constrained to rotation about a fixed axis substantially parallel to that of the contactor but offset therefrom; and a driving connection between the actuator and the contactor comprising, internal gear teeth connected with the contactor, and external gear teeth connected with the actuator and meshing with the internal teeth.

5. In an electric switch of the character described: a rotary contactor; a rotatable actuator for the rotary contactor; a body for the switch having substantially parallel communicating bores axially offset, one of which receives the contactor and constrains it to rotary motion about a fixed axis and the other of which receives the actuator and constrains it to rotary motion about a fixed axis; and a driving connection between the actuator and the contactor comprising, a metal plate nonrotatably connected with the contactor and adjacent to the inner end of the cylinder, said metal plate having an aperture therein defining a plurality of internal gear teeth, and a projection integral with the actuator and projecting from its inner end into said aperture, said projection forming external gear teeth which mesh with the internal teeth of the metal plate.

6. In a switch of the character described: a rotary contactor; means constraining the rotary contactor to rotation about a fixed axis; a rotatable actuator for the contactor; a substantially cup-shaped metal stamping having a flat end wall with an aperture therein, one edge of said aperture forming internal gear teeth; tangs struck from the edge of the stamping and having a nonrotatable driving connection with the contactor, whereby said stamping moves in unison with the contactor; means constraining the rotatable actuator to rotary movement about a fixed axis substantially parallel to that of the switch contactor but spaced therefrom; and a projection on the inner end of the actuator in the form of external gear teeth, said projection entering the aperture of the stamping so that its teeth mesh with those of the stamping.

7. In an electric switch: a rotary contactor; a driver for the contactor comprising, an insulated member nonrotatably connected with the contactor to move in unison therewith, and a substantially cup-shaped metal stamping engaging said insulated member and having means thereon to provide a nonrotatable driving connection between the stamping and the insulated member, said cup-shaped stamping having an aperture in its end wall shaped to provide abutments eccentric to the axis of the contactor and adapted to be engaged by a driving member rotatable about an axis parallel to but spaced from that of the contactor.

8. In a switch of the character described: a rotary contactor; a rotatable actuator for the contactor axially offset with relation to the contactor; an insulated driver drivingly connected with the contactor; said driver having peripheral notches; a metal stamping having a flat wall overlying the driver, said flat wall having an opening therein shaped to provide internal gear-tooth-like abutments; tangs on the stamping engaging in the peripheral notches of the driver; and means on the actuator providing gear-tooth-like abutments meshing with those of the stamping.

EDWARD N. JACOBI.